

REMARKS

Reconsideration of this application is requested. Claims 1-12 are active in the application subsequent to entry of this Amendment.

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention.

Claims 1, 3, 4, 7, 9 and 10 have been amended in order to characterize the phenolic resin as being porous and air-permeable. This is consistent with the description of the invention throughout the specification including "porous and breathable" (page 5, line 1), "air flows into the honeycomb core" (page 5, lines 11-12) and Figures 5, 7 and 8 reporting the results of air-permeability tests. Accordingly, there is ample basis for the amendments made to these claims.

In items 1-2 of the Official Action the examiner correctly points out that the trademark "NOMEX®" as used in the claims 6 and 12 without designation of trademark status is inappropriate. The claims have been amended to use the generic term "aramid fiber" which is consistent with the art-recognized meaning for this term, for instance in U.S. 5,688,353, column 9, lines 62-64, as pointed out by the examiner on page 3, item 4 of the Official Action. Consistent with this Amendment to claims 6 and 12, page 5 of the specification is amended to use the same description as used in the '353 patent.

Original claims 1-4, 6-10 and 12 have attracted a rejection of alleged anticipation over U.S. 5,688,353 (mentioned above) while original claims 1-12 are rejected as being anticipated by U.S. 6,251,497.

To anticipate a claim, a single reference must disclose the claimed invention with sufficient clarity to prove its existence in the prior art. *Motorola Inc. v. Interdigital Technology Corp.*, 43 USPQ2d 1481, 1490 (Fed. Cir. 1997). Anticipation rejections are only proper when the "claimed subject matter is identically disclosed or described in 'the prior art', without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference." *In re Arkley*, 172 USPQ 524, 526 (CCPA 1972); *see also Akzo N.V. v. International Trade Commission*, 1

USPQ 2d 1241, 1246 (Fed. Cir. 1986); *Ex parte Lee*, 31 USPQ 2d 1105, 1108 (BPAI 1993). Every element of the challenged claim must be disclosed within this single reference. *PPG Industries Inc. v. Guardian Industries Corp.*, 37 USPQ2d 1618, 1624 (Fed. Cir. 1996). Absence from the reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.* 23 USPQ 160 (Fed. Cir. 1986).

Applicants' claims as above amended are patentable over each of the cited references since they each fail to disclose each element of applicants' claims.

As recited in the amended claim 1, the present invention relates to a honeycomb sandwich panel, in which the front surface layer 13, the rear surface layer 14 or both layers 13 and 14 closing openings of the cells 12a of the honeycomb core 12 is made of a fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.

Employing this structure, when the honeycomb sandwich panel is used in a vacuum, the air in the cells 12a goes out through one or both of the front and surface layers. Thus, since no difference in pressure is made between the inside and the outside of the sandwich panel, the front surface layer 13 and the rear surface layer 14 are prevented from being damaged or removed/dislodged from the honeycomb core.

U.S. Patent No. 5,688,353 (Dublinski et al) cited by the examiner discloses a honeycomb sandwich panel having cells extending therethrough in the thickness direction of the honeycomb core and front and rear surface layers closing openings of the cells. It states that the front and rear surface layers may be made of a fiber reinforced plastic using a phenolic resin as a matrix. It also discloses that the honeycomb sandwich panel can be used in a spacecraft.

However, Dublinski et al contains no description or suggestion that the front and rear surface layers are made of a fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix. Therefore, if the impervious honeycomb sandwich panel of Dublinski is used in a vacuum, any difference in pressure will be made between the inside and the outside of the sandwich panel, with the result that the front and rear surface layers may be damaged or removed from the honeycomb core.

U.S. Patent No. 6,251,497 (Hoopingarner et al) cited by the examiner discloses a honeycomb sandwich panel having cells 37 extending therethrough in the thickness direction of the honeycomb core 32 and front and rear surface layers 38 closing openings of the cells. It discloses that the front and rear surface layers may be made of a fiber reinforced plastic using a phenolic resin as a matrix. It also discloses that the honeycomb sandwich panel can be used in a spacecraft.

However, Hoopingarner et al contains no description that the front and rear surface layers are made of a fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages is captioned "Version With Markings To Show Changes Made."

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

Arthur R. Crawford
Reg. No. 25,327

ARC:eaw
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph beginning at page 4, line 26:

With the above honeycomb sandwich panel, the honeycomb core is not breathable but the front or rear surface layer or both are porous and breathable. Therefore, when the panel is used in a vacuum, the air in the cells goes out through the front and rear surface layers. Thus, since no difference in pressure is made between the inside and the outside of the sandwich panel, the front and rear surface layers are prevented from being damaged or removed from the honeycomb core. As a result, the sandwich panel with high durability can be obtained. Moreover, even when the ambient pressure is returned to a normal pressure or increased above atmospheric pressure, since air flows into the honeycomb core, no excessive force is applied to the honeycomb sandwich panel. The honeycomb core may be made of Nomex®, a registered trademark of E.I. duPont de Nemours & Co., Wilmington, DE, for an aramid fiber, aluminum or a fiber reinforced plastic. Since the front and rear surface layers have air passages connected to the outside, the shape of the panel is not limited by the process for forming end faces (edge) of the panel but has a degree of freedom. For example, it is possible to form a panel or a structure member with a closed cross section to improve the torsional rigidity. Thus, the panel or a structure member has (much) more freedom of strength. Furthermore, since no special process is additionally required, the manufacturing cost can be saved.

IN THE CLAIMS

1. (Amended) A honeycomb sandwich panel comprising:
 - a honeycomb core having a number of cells extending therethrough in a thickness direction of the honeycomb core; and
 - a front surface layer and a rear surface layer provided on both sides of the cells in the thickness direction of the honeycomb core and closing openings of the cells, at least one of the front surface layer and the rear surface layer being made of a fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.
3. (Amended) A honeycomb sandwich panel according to claim 1, wherein each of the front surface layer and the rear surface layer is made of a carbon fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.
4. (Amended) A honeycomb sandwich panel according to claim 1, wherein each of the front surface layer and the rear surface layer is made of a glass fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.
6. (Amended) A honeycomb sandwich panel according to claim 1, wherein the honeycomb core is made of a material selected from the group consisting of [Nomex] an aramid fiber and a glass fiber reinforced plastic.
7. (Twice Amended) A honeycomb sandwich panel for use in an interior material, exterior material, partition material or structural member of a spacecraft comprising:
 - a honeycomb core having a number of cells extending therethrough in a thickness direction of the honeycomb core; and

a front surface layer and a rear surface layer provided on both sides of the cells in the thickness direction of the honeycomb core and closing openings of the cells, at least one of the front surface layer and the rear surface layer being made of a fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.

9. (Amended) A honeycomb sandwich panel according to claim 7, wherein each of the front surface layer and the rear surface layer is made of a carbon fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.

10. (Amended) A honeycomb sandwich panel according to claim 7, wherein each of the front surface layer and the rear surface layer is made of a glass fiber reinforced plastic using a porous and air-permeable phenolic resin as a matrix.

12. (Amended) A honeycomb sandwich panel according to claim 7, wherein the honeycomb core is made of a material selected from the group consisting of [Nomex] an aramid fiber and a glass fiber reinforced plastic.